

ENGRCEE 123 TRANSPORTATION SYSTEMS III: PLANNING AND FORECASTING

(Not required for any major. Selected elective for CE)

Catalog data:

ENGRCEE 123 Transportation Systems III: Planning and Forecasting (Credit Units: 4).

Theoretical foundations of transportation planning, design, and analysis methods. Theory and application of aggregate and disaggregate models for land use, trip generation, destination, mode, and route choice. Transportation network analysis. Planning, design, and evaluation of system alternatives. Laboratory sessions. Co-requisites: CEE110; Pre-requisite: CEE121. Concurrent with ENGRCEE 223. Civil Engineering majors have first consideration for enrollment. (Design Units: 2)

Required Textbook: None

Recommended Textbook: Ortuzar, J de D & Willumsen, L (2011). *Modeling Transport* Wiley (4th Ed.). ISBN-13 978-0470760390.

References: Course web site: <https://www.its.uci.edu/~mmcnally/cee/cee123/>

Faculty: Professor Michael G. McNally, Civil & Environmental Engineering

Course Learning Outcomes: Student will:

1. Understand role of modeling in transportation planning
2. Develop transport network and activity system data structures
3. Identify and evaluate current and anticipated transportation network problems based on travel demand and network performance
4. Estimate, validate, and apply models for trip generation, trip distribution, mode choice, and trip assignment
5. Develop designs & cost estimates for networks alternatives
6. Develop well-organized, well-written technical reports

Prerequisites:

- Fundamentals of transportation systems
- Basic probability and statistics
- Engineering economics and cost estimation

Lecture Topics:

- Problem Definition, Transportation Planning and Design (1 week)
- Transportation Networks, Demand and Performance Models, Travel Forecasting (1 week)
- Trip Generation Analysis (2 weeks)
- Trip Distribution and Mode Choice (2 weeks)
- Time-of-Day and Trip Assignment (2 week)
- Network Design and Project Evaluation (2 weeks)

Class Schedule: Meets for 3 hours of lecture and 2-hours of lab each week for 10 weeks.

Computer Usage: MS Office; TransCAD version 10 [<http://www.caliper.com/>]

Laboratory Projects: Term project uses TransCAD, a PC-based Geographical Information System for transportation. The project focuses on the planning, analysis, and design of transportation networks. Student teams produce two intermediate and a comprehensive final report. Iterative network design solutions are featured for each team.

Professional Component: Contributes to the design experience and Engineering Topics courses of Civil Engineering majors.

Design Content Description:

Approach: Students learn the design process in the context of an integrated project throughout the quarter. Student teams are tasked with developing a transportation forecasting model for a hypothetical city, designing the transportation network and all model components. The base year and future “no build” alternatives provide students with the opportunity to define transportation problems and draw upon technical and creative skills to develop future network designs and apply analysis skills to ensure that the designs are workable. An overview of the planning and design process is followed by each modeling component being presented to reflect its role in the planning and design processes, leading toward the evaluation of network and land development problems and solutions, including constraints and economic aspects of alternatives.

Lectures: 50%

Laboratory: 50%

Grading Criteria:

HW: 10%

Quizzes: 5%

Lab Project: 35%

Midterm: 20%

Final: 30%

Total: 100%

ABET Content:	Math/Basic Science: <u>0</u> credit units or <u>0%</u>
	Computing: 0 credit units or 0%
	Engineering Science: <u>2</u> credit units or <u>50%</u>
	Engineering Design: <u>2</u> credit units or <u>50%</u>

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Last modified: March 2026 (mgm)

CEP Approval: Fall 2016